

SHALLOW M.H. SECTION
 (PRE-CAST CONCRETE ASTM C-478)

REVISIONS			
No.	Date	Description	By

Date: 4/20/09

SHALLOW MANHOLE SECTION

Seal:

STANDARD DETAILS

FIGURE SAN-1

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



CAST IRON, HEAVY DUTY, MANHOLE FRAME & SOLID INDENTED COVER MARKED SANITARY SEWER WITH CONCEALED PICKHOLE & WATERTIGHT INFLOW GUARD (U.S. FOUNDRY #576 RING WITH BH COVER OR APPROVED EQUAL) (TYPICAL)

WATERTIGHT MANHOLE INFLOW GUARD

SOLID BRICK
 4 COURSES / 10" MAX.
 2 COURSES / 5" MIN.

MORTAR

FINISHED GRADE

ORIENT ECCENTRIC CONE AS DIRECTED BY ENGINEER IN FIELD. (SLOPE ON DOWNSTREAM SIDE)

3" CL. (TYP)

24" DIA. MIN.
 8" MIN.

CAULK JOINTS WITH RAM-NEK IN STRICT COMPLIANCE WITH MFG'R SPECIFICATIONS

NO LIFT HOLES THRU WALLS. PARTIAL LIFT HOLES TO BE FILLED WITH EXPANDABLE GROUT.

PIPE TO MANHOLE CONNECTOR ASTM C-923 CAST IN PLACE NEOPRENE BOOT

VARIABLES

4 - #4 BARS X 22" TYP. AT HOLES

MONOLITHIC BASE AND WALLS

WELDED WIRE FABRIC (MIN. STEEL AREA OF 0.20 SQ IN. /FT. EACH WAY) OR # 4 BARS AT 12" O.C. E.W.

12" IF DEPTH OF COVER IS MORE THAN 144"

3/4" COMPACTED ROCK

LIFT HOOKS 4 REQUIRED

6" 8" 48" DIA. MIN. 8" 6"
 76" DIA. MIN.

STANDARD MANHOLE

(PRE-CAST CONCRETE ASTM C-478)

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Date: 4/20/09
 STANDARD MANHOLE

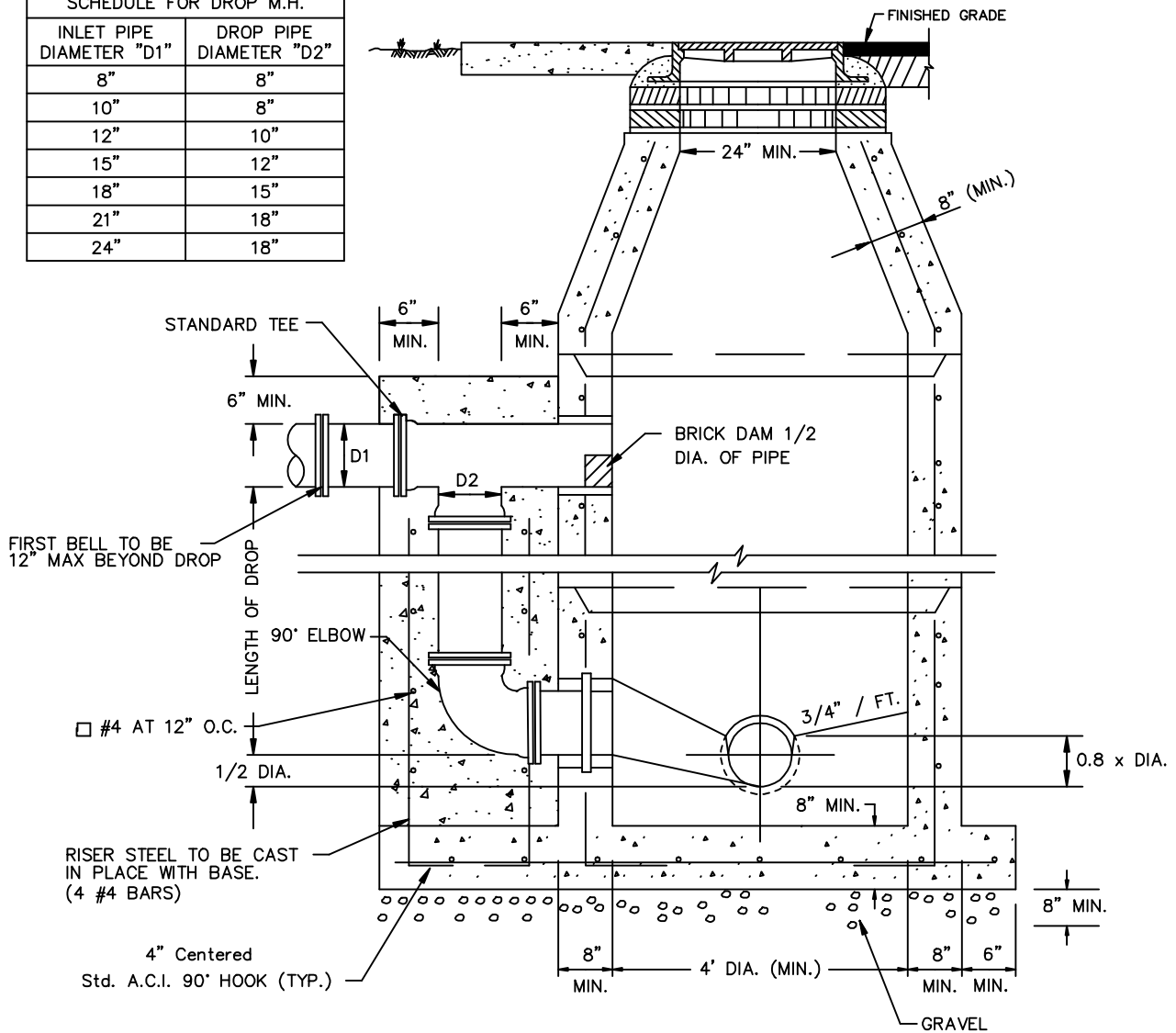
Seal:

STANDARD DETAILS

FIGURE SAN-2

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

SCHEDULE FOR DROP M.H.	
INLET PIPE DIAMETER "D1"	DROP PIPE DIAMETER "D2"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"



NOTES:

1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD TAMARAC MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. THE PRECAST BASE SHALL EXTEND FULLY UNDER THE DROP ASSEMBLY.
3. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN CHANNEL INVERT.

DROP CONNECTION MANHOLE

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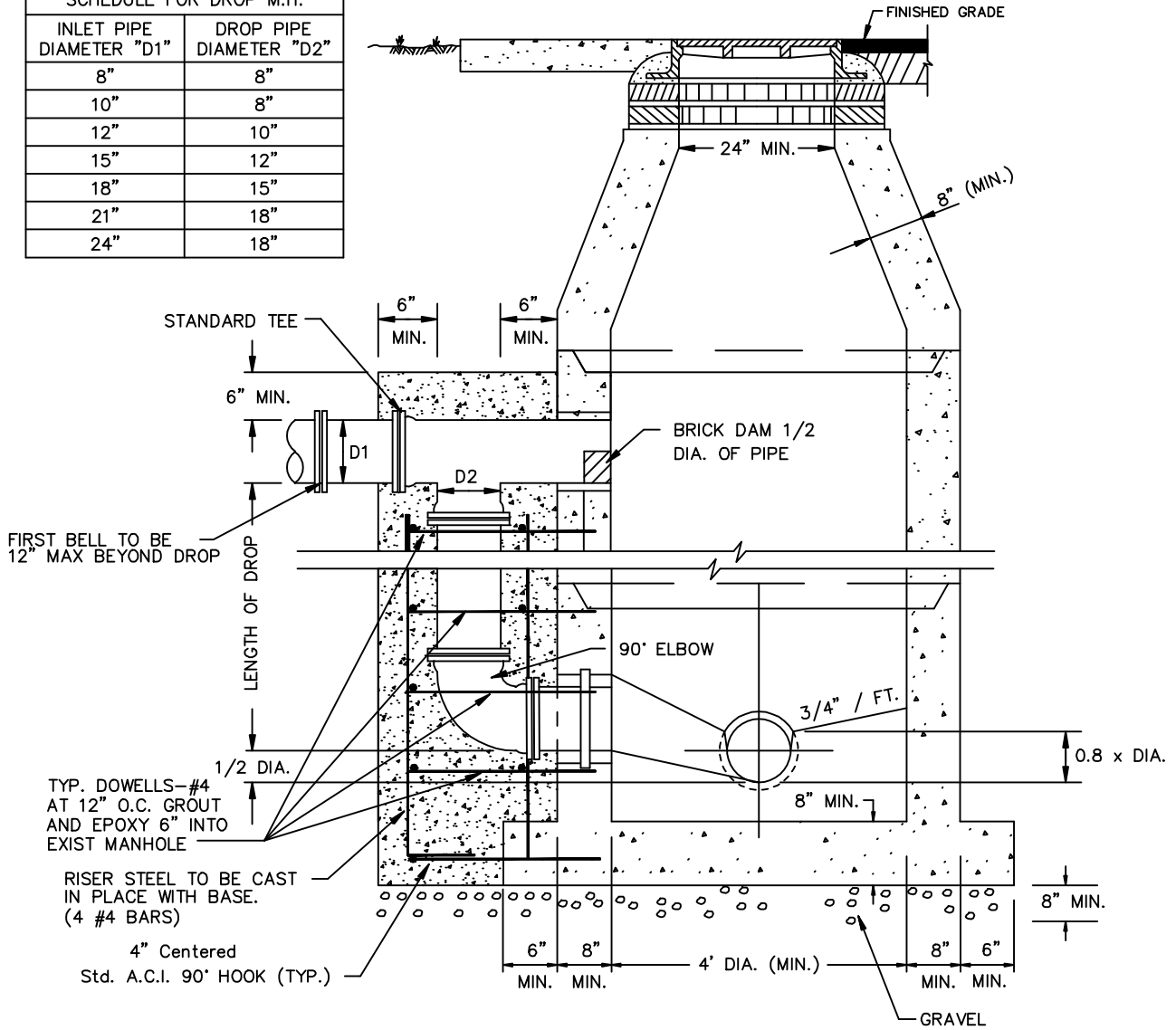
DROP CONNECTION MANHOLE

STANDARD DETAILS

FIGURE SAN-3

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

SCHEDULE FOR DROP M.H.	
INLET PIPE DIAMETER "D1"	DROP PIPE DIAMETER "D2"
8"	8"
10"	8"
12"	10"
15"	12"
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NOTES:

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**DROP CONNECTION FOR
 STANDARD EXIST. MANHOLES**

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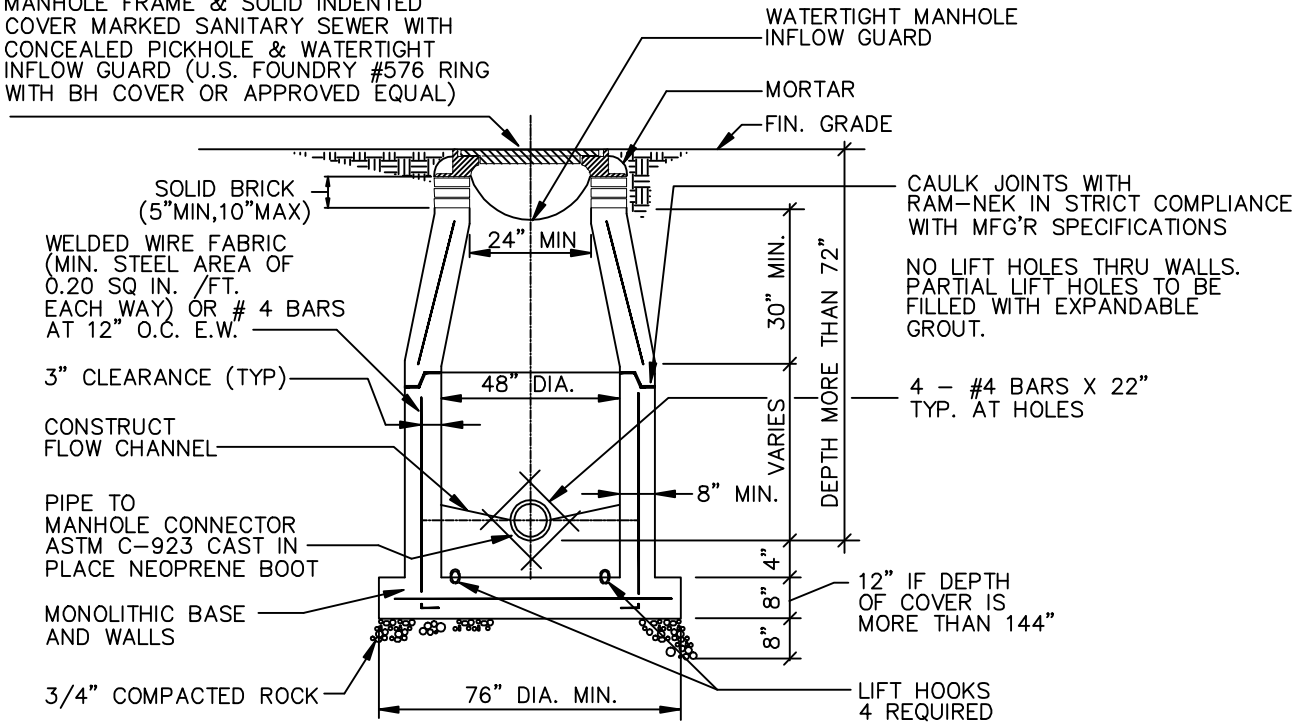
DROP CONNECTION FOR
 STANDARD EXIST. MANHOLES

STANDARD DETAILS

FIGURE SAN-4

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

CAST IRON, HEAVY DUTY,
 MANHOLE FRAME & SOLID INDENTED
 COVER MARKED SANITARY SEWER WITH
 CONCEALED PICKHOLE & WATERTIGHT
 INFLOW GUARD (U.S. FOUNDRY #576 RING
 WITH BH COVER OR APPROVED EQUAL)



ALTERNATE MANHOLE

(PRE-CAST CONCRETE ASTM C-478)

PRE-CAST REINFORCED CONCRETE ONLY MINIMUM 8" WALL
 THICKNESS 4000 LBS. STRENGTH TESTING LABORATORY

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ALTERNATE MANHOLE

Seal:

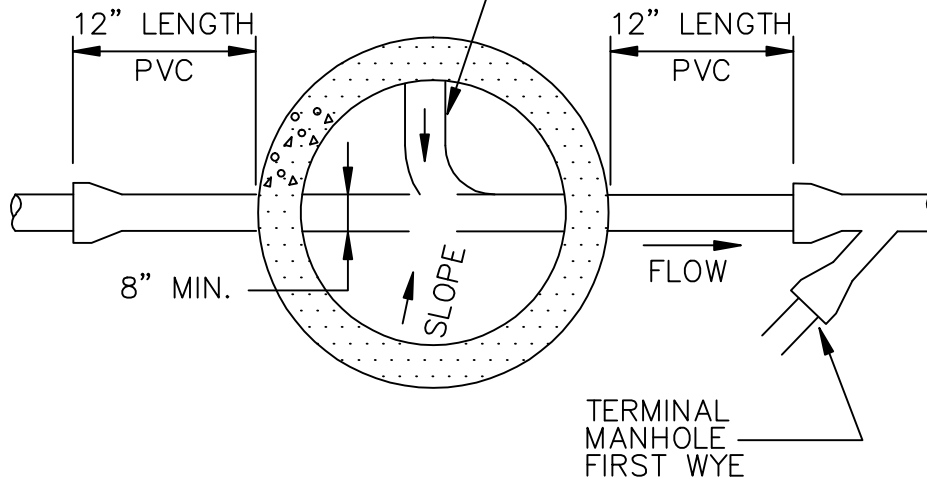
STANDARD DETAILS

FIGURE SAN-5

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA

NOTE:
 BOTTOM & CHANNELS OF MANHOLES
 TO BE FINISHED SMOOTH WITH A
 STEEL TROWEL. FILLET TO BE
 BRICK AND CEMENT (NO LOOSE
 STONE COVERED WITH MORTAR).

CHANNELS FOR FUTURE CONNECTIONS
 (STUBS) SHALL BE CONSTRUCTED,
 FILLED WITH SAND AND COVERED
 WITH 1" OF MORTAR.



TIE - IN DETAIL

MIN. SLOPE THROUGH STANDARD 48" DIA. MANHOLE
 SHALL BE 2.5% (0.10' FALL ACROSS M.H. & 0.05' FALL
 FOR CHANGE IN FLOW DIRECTION).

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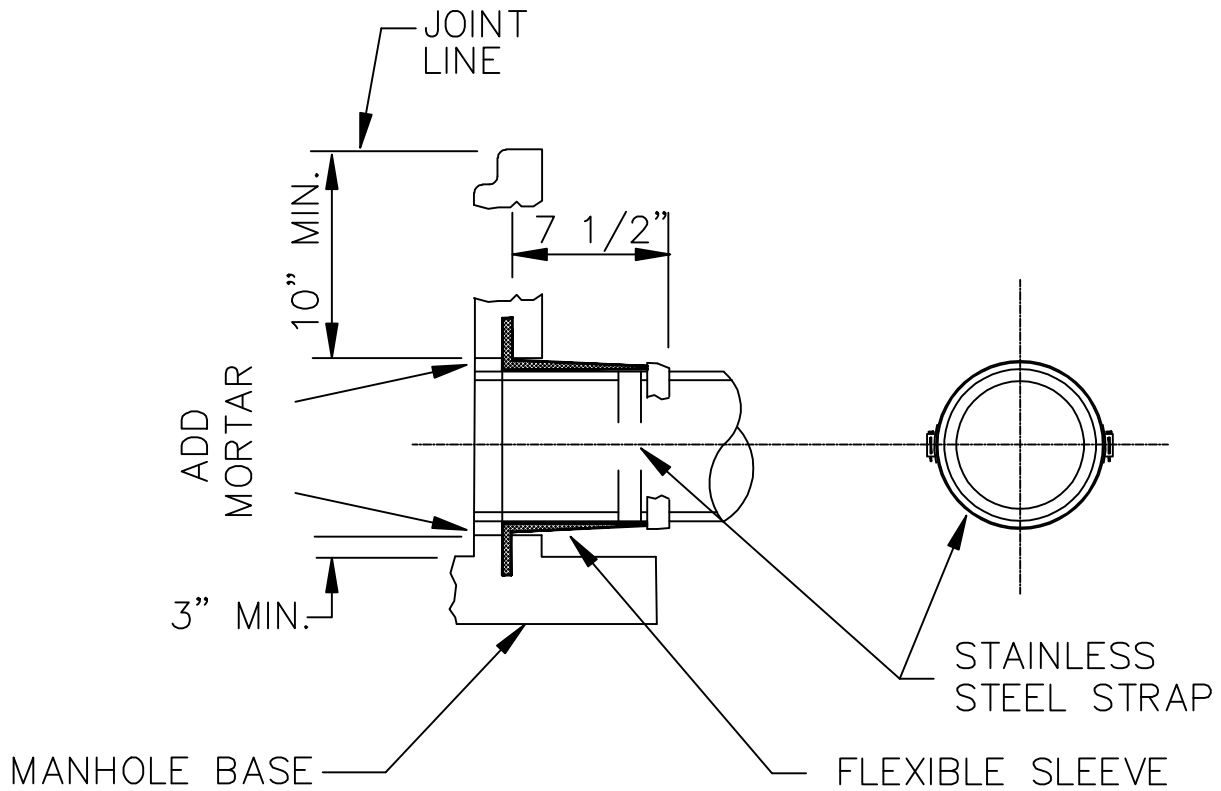
TIE-IN DETAIL

Seal:

STANDARD DETAILS

FIGURE SAN-6

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



LOCK JOINT FLEXIBLE
MANHOLE SLEEVE

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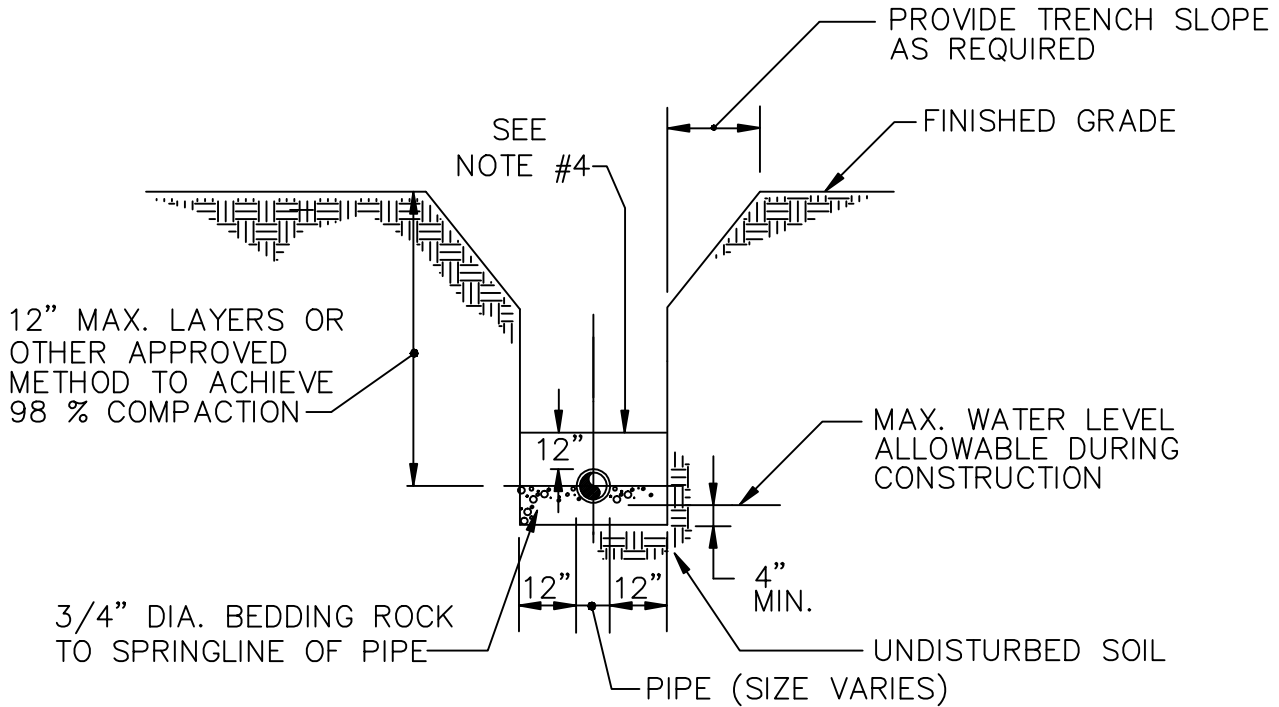
LOCK JOINT
 FLEXIBLE MANHOLE SLEEVE

Seal:

STANDARD DETAILS

FIGURE SAN-7

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



NOTE

1. WHERE SOIL CONDITIONS CAN NOT BE MAINTAINED AS SHOWN ABOVE, PROVIDE APPROVED METHOD OF CONSTRUCTION.
2. SHEETING WILL BE REQUIRED AS DETERMINED IN THE FIELD.
3. COMPACTION PERCENTAGES SHOWN REFER TO AASHTO T-180.
4. MECHANICAL COMPACTION NOT ALLOWED BELOW THIS LEVEL.

TRENCH DETAIL (UNPAVED AREAS)

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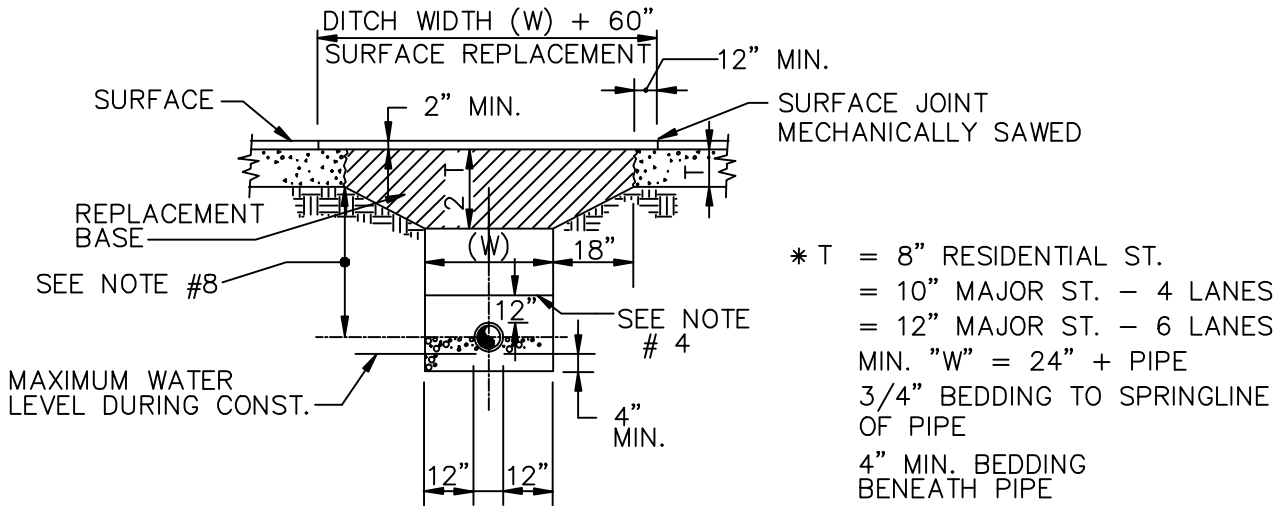
TRENCH DETAIL - SEWER
 (UNPAVED AREAS)

Seal:

STANDARD DETAILS

FIGURE SAN-8

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



NOTE

1. REPLACED BASE MATERIAL OVER DITCH SHALL BE TWICE THE THICKNESS OF THE ORIGINAL BASE, BUT NO LESS THAN "T" SCHEDULE.
2. BASE MATERIAL SHALL BE PLACED IN TWO OR THREE LAYERS AND EACH LAYER THOROUGHLY ROLLED AND TAMPED TO MAXIMUM DENSITY (98 %).
3. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED.
4. MECHANICAL COMPACTION NOT ALLOWED BELOW THIS LEVEL.
5. NEW SURFACE MATERIALS WILL BE CONSISTENT WITH THE EXISTING SURFACE.
6. PERMIT REQUIRED FROM PUBLIC WORKS ENGINEERING TO CUT PAVEMENT.
7. IF DITCH IS FILLED TEMPORARILY IT SHALL BE COVERED WITH A 2" ASPHALTIC CONC. PATCH UNTIL REPLACED WITH A PERMANENT PATCH.
8. 12" MAX. LAYERS OR OTHER APPROVED METHOD TO ACHIEVE 98% COMPACTION.

TRENCH DETAIL (PAVED AREAS)

REVISIONS		
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Date: 4/20/09

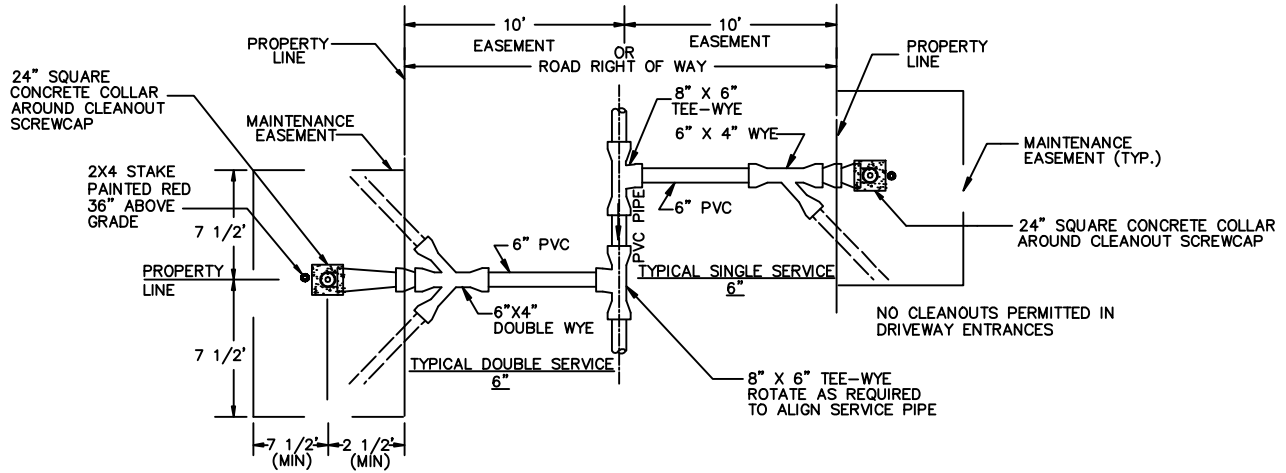
TRENCH DETAIL - SEWER
(PAVED AREAS)

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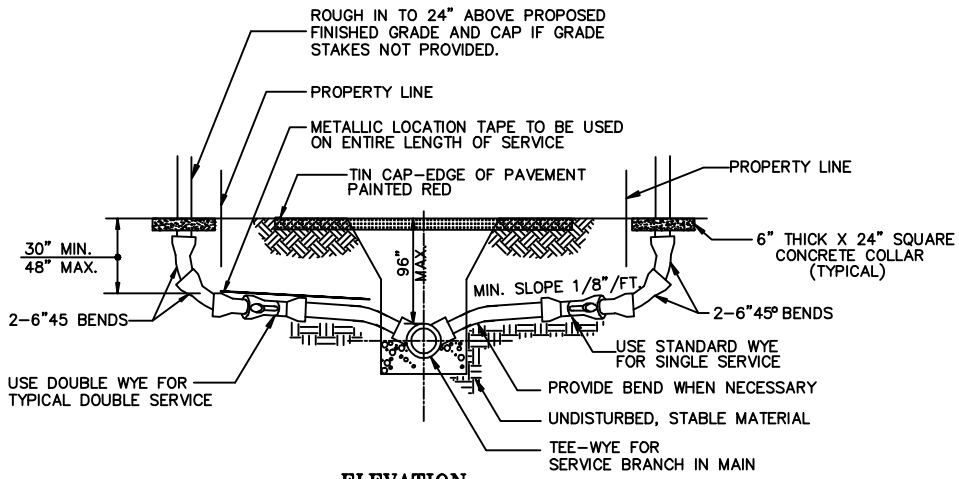
STANDARD DETAILS

FIGURE SAN-9

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



PLAN VIEW



ELEVATION

SHALLOW LATERAL

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No.	Date	Remarks

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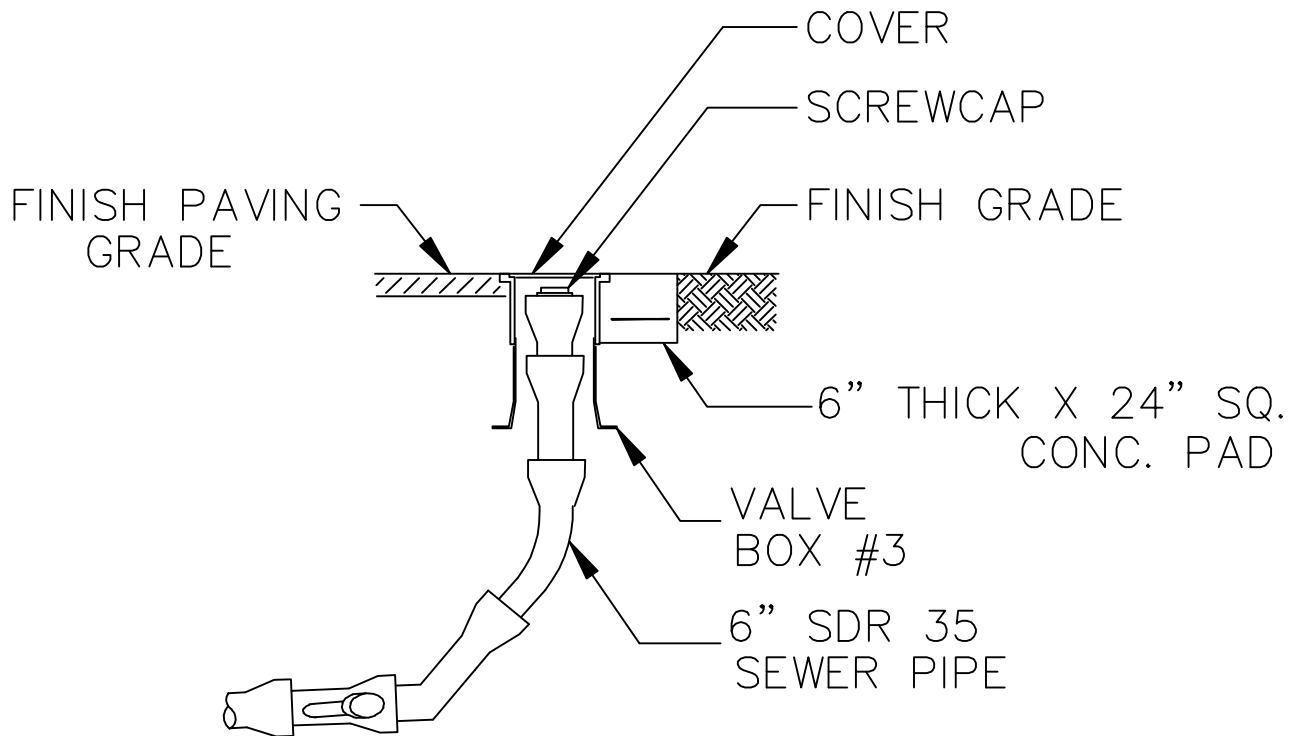
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SHALLOW SEWER
 LATERAL CONNECTION

STANDARD DETAILS

FIGURE SAN-10

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



CLEAN-OUT DETAIL

REVISIONS		
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Date: 4/20/09

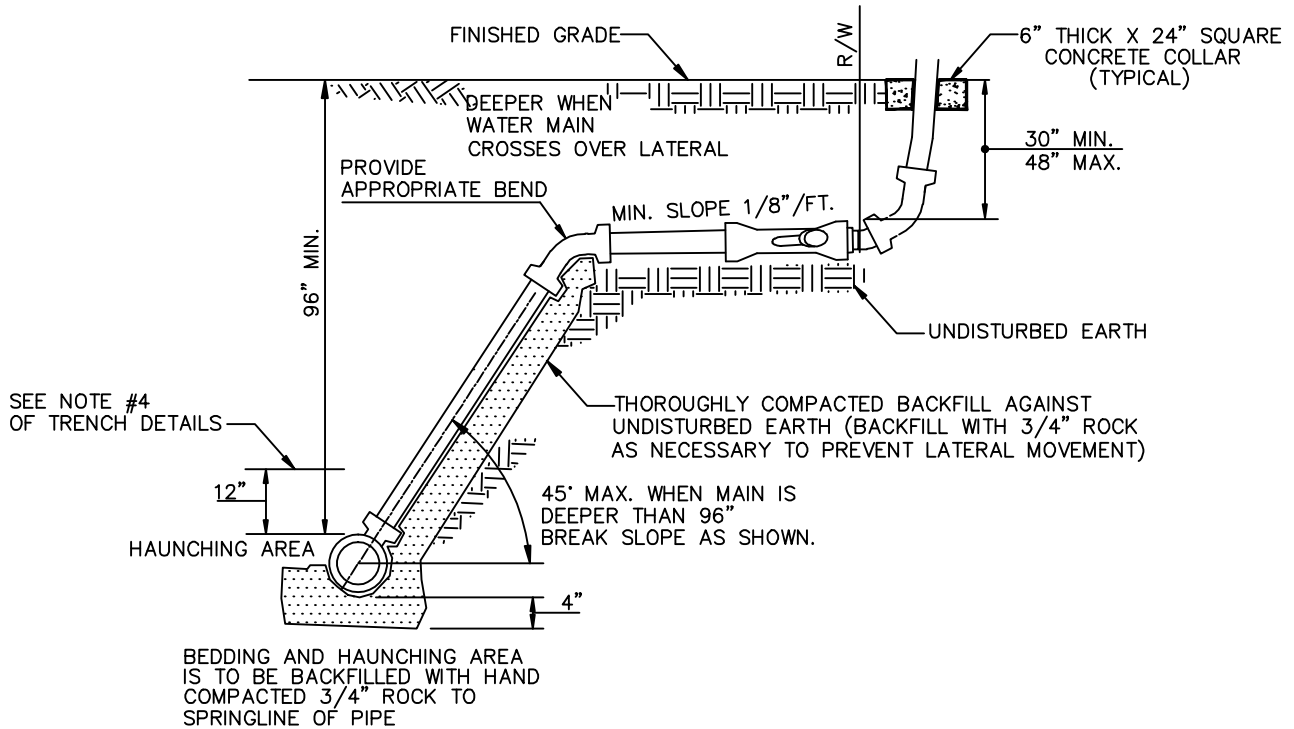
Seal:

CLEAN-OUT DETAIL

STANDARD DETAILS

FIGURE SAN-11

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



DEEP LATERAL

REVISIONS		
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Date: 4/20/09

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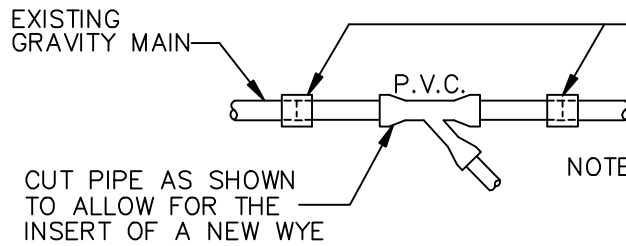
DEEP SEWER
LATERAL CONNECTION

Seal:

STANDARD DETAILS

FIGURE SAN-12

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



USE FERNCO COUPLING FOR CLAY TO P.V.C.
 & HARCO COUPLING FOR P.V.C.
 OR D.I. TO P.V.C. (TYP)

NOTE: THE CONTRACTOR SHALL NOTIFY
 THE CITY OF TAMARAC UTILITIES DEPARTMENT
 24 HOURS PRIOR TO STARTING TIE-IN AND
 PLACE NO BACKFILL UNTIL APPROVED.

**LATERAL TIE-IN TO
 EXISTING GRAVITY SEWER**

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LATERAL TIE-IN
 TO EXISTING GRAVITY SEWER

Seal:

STANDARD DETAILS

FIGURE SAN-13

CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



SEWER NOTES

1. GRAVITY SEWER PIPE
 UNLESS OTHERWISE NOTED OR APPROVED, ALL GRAVITY MAINS AND SERVICE LATERALS SHALL BE UNPLASTICIZED POLYVINYL CHLORIDE (PVC). NON-PRESSURE PIPE CONFORMING TO ASTM D3034 AND SDR 35 WITH INTEGRAL WALL BELL AND SPIGOT JOINTS FOR PUSH-ON RUBBER GASKET TYPE JOINT SEALS CONFORMING TO ASTM D1369.
2. MANHOLE CONNECTIONS
 CONNECTIONS OF PVC PIPE TO NEW MANHOLES SHALL BE MADE WITH FLEXIBLE BOOT MANHOLE COUPLINGS CONFORMING TO ASTM C923. CONNECTIONS TO EXISTING MANHOLES SHALL BE MADE BY USING PVC MANHOLE ADAPTORS WITH AN EXTERNAL SURFACE OF EPOXY AND SAND OR EQUAL AS APPROVED BY THE CITY.
 ALL CONNECTIONS TO EXISTING MANHOLES SHALL HAVE A WATER TIGHT TEMPORARY MECHANICAL PLUG UNTIL REMOVAL IS AUTHORIZED BY THE CITY.
3. MANHOLES
 ALL MANHOLES SHALL BE PAINTED ON THE INSIDE AND OUTSIDE SURFACES (INCLUDING CONNECTIONS AND JOINTS) WITH TWO (2) COATS OF KOPPER 300M OR APPROVED EQUAL. ALL COATINGS SHALL BE APPLIED AFTER PRELIMINARY INSPECTION (ONE COAT RED AND ONE COAT BLACK OR OTHER APPROVED ALTERNATE METHOD).
 MANHOLES SHALL BE SET PLUMB TO LINE AND GRADE, AND MUST BE INSPECTED BY THE CITY OF TAMARAC UTILITIES DEPARTMENT BEFORE INSTALLATION.
4. MANHOLE FRAME, COVER AND INFLOW GUARD
 - A.) MANHOLE FRAMES AND COVERS SHALL BE CAST IRON, HEAVY DUTY. MANUFACTURED BY U.S. FOUNDRY, NEENAH OR EQUAL. SOLID INDENTED COVERS SHALL BE MARKED "SANITARY SEWER" AND SHALL HAVE CONCEALED PICKHOLES.
 - B.) WATERTIGHT MANHOLE INFLOW GUARDS SHALL BE MANUFACTURED OF HIGH DENSITY POLYETHYLENE EQUAL TO FOSROC SEWER INFLOW GUARDS OR APPROVED EQUAL, MEETING THE REQUIREMENTS OF ASTM D-1248 CLASS A, CATEGORY 5. THE INSERT SHALL ALLOW EASY INSTALLATION WITHIN THE MANHOLE FRAME. THE DEPTH OF THE INSERT SHALL BE SUCH THAT THE MANHOLE COVER DOES NOT COME IN CONTACT WITH THE VALVES WHEN FLIPPED DURING REMOVAL OR REPLACEMENT.
 - C.) THE GASKET SHALL MEET THE REQUIREMENTS OF ASTM D-395, D-1564, D-624, AND D-1667. THE GASKET SHALL BE HEAT WELDED TO THE INSERT.
5. GRAVITY SEWER INSTALLATION
 - A.) UPON COMPLETION OF THE FINAL GRADE OF ROAD AND PRIOR TO PLACEMENT OF ASPHALT A VISUAL INSPECTION BY LAMPING SHALL BE MADE OF THE COMPLETED SYSTEM ALONG WITH A LOW PRESSURE AIR TEST. AFTER ALL OTHER TESTING HAS BEEN COMPLETED A T.V. INSPECTION SHALL BE MADE BY THE DEVELOPER AND APPROVED BY THE CITY, BEFORE THE LINES ARE ACCEPTED FOR MAINTENANCE. (TAMARAC CODE SECTION 24-38 C).
 IN THE EVENT THE CITY INSPECTOR IS NOT SATISFIED WITH THE LAMPING TEST THE CITY INSPECTOR CAN REQUEST A MANDREL INSPECTION.
 - B.) AT THE END OF THE ONE (1) YEAR WARRANTY PERIOD THE DEVELOPER WILL T.V. INSPECT, AIR TEST EVERY JOINT, AND CHECK MANHOLE JOINTS AND CONNECTIONS TO DETERMINE IF REPAIRS ARE NECESSARY, BEFORE THE WARRANTY BOND IS RELEASED.

REVISIONS		
No.	Date	Remarks

Date: 4/20/09
SEWER NOTES

Seal:

STANDARD DETAILS
FIGURE SAN-14
CITY OF TAMARAC, BROWARD COUNTY, FLORIDA



SEWER NOTES

6. SEWAGE FORCE MAINS

- A.) SEWAGE FORCE MAIN PIPE SHALL BE DUCTILE IRON PIPE (D.I.P.) CONFORMING TO ANSI/AWWA C151/A21.51- LATEST REVISION, WITH A 350 PSI RATING, UNLESS OTHERWISE NOTED. PIPE TO BE LINED WITH A TWO COMPONENT EPOXY AND LAID WITH A THIRTY (30) INCH MINIMUM CLEAR COVER. ALL MECHANICAL JOINT DUCTILE IRON FITTINGS SHALL BE 350 PSI RATED. ALL FITTINGS SHALL BE LINED AND SEALED THE SAME AS THE PIPE.
- B.) THE FORCE MAIN SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH ANSI/AWWA C600 (LATEST REVISION). THE PRESSURE TESTING SHALL BE FOR A PERIOD NOT LESS THAN TWO (2) HOURS AT 150 PSI MINIMUM AT ALL TIMES DURING THE TEST WITH AN ALLOWABLE LEAKAGE NOT TO EXCEED THE FORMULA OF $L = SD \sqrt{P} / 133200$; WHERE L=ALLOWABLE LEAKAGE IN GAL./HR., S=LENGTH OF PIPE TESTED IN FEET, D=NOMINAL DIAMETER OF PIPE IN INCHES, AND P=AVERAGE TEST PRESSURE DURING TEST IN LBS./SQ.IN.

7. VALVES

ALL VALVES SHALL BE PLUG VALVES (HOMESTEAD OR DIZUREK SERIES 100 OR APPROVED EQUAL) FURNISHED WITH EXTENSION TYPE CAST IRON VALVE BOXES OF PROPER LENGTH FOR THE TRENCH DEPTH. ALL BOXES SHALL CONFORM TO AWWA WITH A SHAFT NOT LESS THAN 5" AND HAVE THE WORD "SEWER" CAST IN THE COVER OF THE VALVE BOX AND SHALL CENTERED OVER THE VALVE AND REST FIRMLY ON COMPACTED BACKFILL, BE PLUMB AND BE SUPPORTED AT THE TOP WITH A 6" THICK X 24" SQUARE CONCRETE COLLAR EXCEPT IN PAVED AREAS. VALVE NUT EXTENSION REQUIRED IF DEPTH TO FINISH GRADE EXCEEDS 18". (IDEAL NUT DEPTH 12")

8. SHOP DRAWINGS

- A.) PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER OF RECORD SHOP DRAWINGS OF ALL MATERIALS, PIPE AND APPURTENANCES COVERING THE SEWER SYSTEM INSTALLATION. CONSTRUCTION MAY PROCEED ONCE THE SHOP DRAWINGS HAVE BEEN APPROVED BY THE ENGINEER OF RECORD AND THE CITY OF TAMARAC UTILITIES DEPARTMENT, THE UTILITIES PERMIT HAS BEEN ISSUED, AND AND THE PRECONSTRUCTION MEETING HELD.
- B.) NO SERVICE CONNECTIONS, WYES, SERVICES OR VALVES WILL BE PERMITTED IN RESIDENTIAL DRIVEWAYS.
- C.) ALL VALVES SHALL BE AS-BUILT LOCATED BY THE CONTRACTORS ENGINEER.

9. BACKFILLING

ALL EXCAVATION IN EXISTING RIGHT OF WAY SHALL BE BACKFILLED AT THE END OF EACH DAY TO PERMIT PEDESTRIAN AND VEHICULAR TRAFFIC PRIOR TO CONTRACTOR LEAVING SITE.

10. EASEMENT REQUIREMENTS

WHERE SEWER IS NOT WITHIN PUBLIC R/W IT IS TO BE LOCATED IN A 20' TAMARAC EXCLUSIVE EASEMENT.

11. MAINTENANCE RESPONSIBILITY

OWNERSHIP AND MAINTENANCE OF THE SANITARY SEWER SYSTEM BY THE CITY OF TAMARAC IS LIMITED TO THE MAINS FROM MANHOLE TO MANHOLE AND EXPRESSLY EXCLUDES SEWER LATERAL SERVICES. THE SEWER LATERAL SERVICES FROM THE GRAVITY MAIN TO THE BUILDINGS ARE TO BE MAINTAINED BY THE PROPERTY OWNER.

REVISIONS		
No.	Date	Remarks

Date: 4/20/09	Seal:
SEWER NOTES	

STANDARD DETAILS <i>FIGURE SAN-14a</i> CITY OF TAMARAC, BROWARD COUNTY, FLORIDA
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CITY OF TAMARAC

**PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION**



Job No.

Scale: *N.T.S*

SHEET SAN-14b

GENERAL NOTES

1. THE CITY OF TAMARAC WILL HOLD A PRECONSTRUCTION MEETING PRIOR TO THE START OF ANY PROJECT. IT SHALL INCLUDE A REPRESENTATIVE OF THE CITY OF TAMARAC UTILITIES ENGINEERING DIVISION, THE ENGINEER OF RECORD, THE CONTRACTOR AND ANY OTHER APPLICABLE AGENCY.
2. ALL MATERIAL, INSTALLATION, TESTING AND SPECIFICATIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF TAMARAC CURRENT STANDARDS. WHERE DISCREPANCIES, OMISSIONS OR MODIFICATIONS EXIST BETWEEN THE PLANS AND THE CITY OF TAMARAC MINIMUM CONSTRUCTION SPECIFICATIONS, THE CITY OF TAMARAC SPECIFICATIONS SHALL GOVERN.
3. THE CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. ALL INSTALLATIONS SHALL BE MADE IN SUCH A MANNER AS NOT TO INTERFERE WITH EXISTING OR FUTURE UTILITIES, DRAINAGE OR ROADWAY CONSTRUCTION.
4. WHERE WATER AND SEWER MAINS CROSS WITH LESS THAN 18" VERTICAL CLEARANCE, THE SEWER MAIN WILL BE 20' OF DUCTILE IRON PIPE CENTERED ON THE POINT OF CROSSING. WHEN A WATER MAIN PARALLELS A SEWER MAIN, A SEPARATION OF AT LEAST 10' SHOULD BE MAINTAINED. IF A CROSSING OF THE SEWER MAIN ABOVE A WATER LINE IS UNAVOIDABLE, THEN THE ABOVE MENTIONED PRECAUTIONS SHALL BE OBSERVED REGARDLESS OF THE DISTANCE OF VERTICAL SEPARATION BETWEEN WATER AND SEWER PIPING.
5. ALL PAVEMENT RESTORATION TO BE MADE IN ACCORDANCE WITH THE CITY, COUNTY, OR STATE OF FLORIDA DOT SPECIFICATIONS, WHERE APPLICABLE.
6. COMPLETE "AS-BUILT" INFORMATION RELATIVE TO MANHOLES, VALVES, SERVICES FITTINGS, LENGTH OF PIPE, AND THE LIKE, SHALL BE ACCURATELY RECORDED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE OF THE WORK. ALL ELEVATIONS SHALL BE TAKEN BY AN INDEPENDENT LICENSED STATE OF FLORIDA REGISTERED SURVEYOR AND SHOWN ON AS-BUILT PLANS SEALED BY THE SURVEYOR AND ENGINEER OF RECORD.
7. TRENCHES SHALL BE DE-WATERED TO ENABLE PIPE AND APPURTENANCES TO BE INSTALLED FREE OF WATER. IF PIPE BED IS ROCK, EXCAVATE AN EXTRA 6" AND BACKFILL WITH 3/4" GRAVEL. CONTRACTOR SHALL REMOVE AND DISPOSE OF ANY UNSUITABLE MATERIAL ENCOUNTERED AND REPLACE WITH SUITABLE MATERIAL ALL AT THE CONTRACTORS EXPENSE.
8. BACKFILL MATERIAL FOR SEWER MAIN AND LINES SHALL BE NON-COHESIVE, NON PLASTIC MATERIAL FREE OF DEBRIS, LUMPS AND ORGANIC MATTER. BACKFILL MATERIAL PLACED WITHIN (1) FOOT OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN (2) INCHES IN DIAMETER (1" FOR PVC PIPE) AND NO STONE LARGER THAN SIX INCHES IN DIAMETER WILL BE PERMITTED IN ANY BACKFILL.
9. PVC SHALL BE LAID IN STRICT CONFORMANCE TO MANUFACTURING SPEC (JOHNS MANVILLE RING TITE PVC PIPE INSTALLATION GUIDE OR EQUAL..) BACKFILLING OF UTILITY TRENCHES WILL NOT BE ALLOWED UNTIL INSPECTED BY THE CITY UTILITIES ENGINEERING DIVISION. ALL PIPE SHALL BE INSTALLED IN COMPLIANCE WITH OSHA TRENCH AND EXCAVATION STANDARDS.
10. ALL SEWER LATERAL TIE-INS FOR NEW CONSTRUCTION MUST USE RIGID COUPLINGS OR CONNECTORS.

REVISIONS		
No.	Date	Remarks

Date: 4/20/09
By
SEWER GENERAL NOTES

Seal:

STANDARD DETAILS
FIGURE SAN-14b
CITY OF TAMARAC, BROWARD COUNTY, FLORIDA